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Srinivas Bollapragada

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GENERAL ELECTRIC COMPANY

GLOBAL RESEARCH

ONE RESEARCH CIRCLE

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EXAMINER

WONG, ERIC TAK WAI

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SRINIVAS BOLLAPRAGADA, PIERO PATRONE
BONISSONE, KETE CHARLES CHALERMKRAIVUTH,
NEIL HOLGER WHITE EKLUND, NARESH SUNDARAM IYER, and
RAJESH VENKAT SUBBU

Appeal 2010-002750
Application 10/781,898
Technology Center 3600

Before HUBERT C. LORIN, JOSEPH A. FISCHETTI, and BIBHU R.
MOHANTY, *Administrative Patent Judges*.

MOHANTY, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

The Appellants seek our review under 35 U.S.C. § 134 (2002) of the final rejection of claims 1-3, 5-13, 15-19, and 22 which are all the claims pending in the application. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

SUMMARY OF THE DECISION

We REVERSE.

THE INVENTION

The Appellants' claimed invention is directed to the optimization processing of asset portfolios such as securities (Spec. [0001]). Claim 1, reproduced below with the numbering in brackets added, is representative of the subject matter on appeal.

1. A method for multi-objective portfolio optimization for use in investment decisions based on competing objectives and a plurality of constraints constituting a portfolio problem, the method comprising:
 - generating an initial population of solutions of portfolio allocations in a computing device to substantially cover a portfolio configuration space having a plurality of dimensions defined by the competing objectives and the plurality of constraints;
 - performing a first multi-objective process based on the initial population and the competing objectives to generate a first interim efficient frontier in a portfolio performance space having at least three dimensions;
 - performing a second multi-objective process based on the initial population and the competing objectives to generate a second interim efficient frontier in the portfolio performance space; and
 - [1] fusing the first interim efficient frontier with the second

interim efficient frontier to create a fused efficient frontier for use in investment decisions.

THE REJECTIONS

The Examiner relies upon the following as evidence in support of the rejections:

Zitzler, E. et al., "*Comparison of Multiobjective Evolutionary Algorithms: Empirical Results*", *Evol. Comput.*; 2000 Vol. 8, pp. 173-195.

Hauskrecht, M., and Kveton, B., "*Linear Program Approximations for Factored Continuous-State Markov Decision Processes*." 2003. In the Proceedings of the 17th Annual Conference on Neural Information Processing Systems.

The following rejections are before us for review:

1. Claims 1-3, 5-8, 15, 17-19, and 22 are rejected under 35 U.S.C. § 103(a) as unpatentable over Zitzler.
2. Claims 9-13 and 16¹ are rejected under 35 U.S.C. § 103(a) as unpatentable over Zitzler and Hauskrecht.

¹ Claim 16 (rejected twice or more) was not included in this rejection but its omission is considered to have been a typographical error. The Appellants have indicated in the Brief that claim 16 is rejected and being appealed (Br. 5) and the Examiner has indicated that this status of the claim is correct (Ans. 2). Claim 16 depends from claim 10 which is under this rejection. Regardless, the issues in this Decision turn on analysis related to the independent claims only, and not to claim 16 itself.

THE ISSUES

With regards to claim 1 the issue turns on whether it would have been obvious to modify Zitzler to include an efficient frontier with at least 3 dimensions and to also include the limitations of claim limitation [1]. The remaining claims turn on a similar issue.

FINDINGS OF FACT

We find the following enumerated findings of fact (FF) are supported at least by a preponderance of the evidence². Additional facts may appear in the Analysis section below.

FF1. Zitzler discloses the systematic comparison of various evolutionary approaches to multiobjective test functions using six test functions. By investigating different features, it is possible to predict the kinds of problems to which certain techniques are not well suited. The experimental results indicate a hierarchy of the algorithms under consideration. (Abstract).

FF2. Zitzler at 6.1 (pp. 181-182) discloses comparing eight algorithms (RAND, FFGA, NPGA, HLGA, VEGA, NSGA, SOEA, SPEA) with six proposed test functions.

FF3. Zitzler at 6.2 (pp. 182-188) discloses the simulation results for each of the test functions with the eight algorithms. The simulation results prove that multiobjective EAs do better than the random search algorithm.

² See *Ethicon, Inc. v. Quigg*, 849 F.2d 1422, 1427 (Fed. Cir. 1988) (explaining the general evidentiary standard for proceedings before the Patent Office).

FF4. Zitzler at 6.2 (p. 182) discloses that the “the outcomes of the first five runs were unified, and then the dominated solutions were removed from the union set”.

ANALYSIS

The Appellants argue that the rejection of claim 1 is improper because “one skilled in the art would not be motivated to modify the Zitzler reference to meet the claimed invention because the Zitzler reference is directed to comparing the efficient frontiers from eight different multi-objective processes” (Br. 22).

In contrast, the Examiner has determined that the rejection of record is proper (Ans. 4-5, 8-9).

We agree with the Appellants. The claim requires that the first interim efficient frontier has “at least 3 dimensions” and the Examiner has acknowledged that the Zitzler reference fails to disclose this (Ans. 4). The claim also requires claim limitation [1] which requires: “*fusing the first interim efficient frontier with the second interim efficient frontier to create a fused efficient frontier* for use in investment decisions”. (Emphasis added). Zitzler at 6.1 discloses comparing eight algorithms with six proposed test functions (FF2). While Zitzler discloses that the outcomes of the first five runs were unified, it also discloses that the dominated solutions *were removed from the union set* (FF4). Thus, the dominated solutions were not included in the union set in Zitzler at 6.1. In *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398 (2007) the Supreme Court at 418 noted that in an obviousness analysis “rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of

obviousness”. Here we see no articulated reasoning with some rational underpinning to modify the Zitzler reference to include both an efficient frontier with at least 3 dimensions and also the limitations of claim limitation [1] drawn to the fusing of the first and second efficient frontiers to create a fused frontier in the manner claimed so the rejection of record for claim 1 and its dependent claims is not sustained.

The remaining claims contain a claim limitation similar to those addressed above and the rejection of claim 17-22 is not sustained for these same reasons.

CONCLUSIONS OF LAW

We conclude that Appellants have shown that the Examiner erred in rejecting claims 1-3, 5-8, 15, 17-19, and 22 under 35 U.S.C. § 103(a) as unpatentable over Zitzler.

We conclude that Appellants have shown that the Examiner erred in rejecting claims 9-13 and 16 under 35 U.S.C. § 103(a) as unpatentable over Zitzler and Hauskrecht.

DECISION

The Examiner’s rejection of claims 1-3, 5-13, 15-19, and 22 is reversed.

REVERSED

Appeal 2010-002750
Application 10/781,898

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